Table 1. Quality and economics of groundnut variety GG 2 as influenced by irrigation schedule, interrow spacing, and seed rate, Sardar Krushinagar, Gujarat, summer 1992.

Treatment	Shelling percentage	Oil content (%)	Oil yield (kg ha^{-1})	Net realization (Rs ha^{-1})	Net ICBR[1]
Irrigation (IW/CPE ratio)					
I_1 = 0.8	68.05	48.82	692	13 724	
I_2 = 1.0	70.03	48.89	781	15 416	1:4.70
I_3 = 1.2	70.47	48.87	799	15 485	1:2.45
LSD (P = 0.05)	1.97	ns	53		
Interrow spacing (cm)					
S_1 = 15.0	69.50	48.85	776	15 473	
S_2 = 22.5	69.44	48.89	803	16 241	
S_3 = 30.0	69.61	48.83	691	12 911	
LSD (P = 0.05)	ns	ns	34		
Seed rate (kg ha^{-1})					
R_1 = 100	69.43	48.85	712	14 084	
R_2 = 125	69.61	48.88	773	15 300	1:2.38
R_3 = 150	69.51	48.84	785	15 240	1:1.13
LSD (P = 0.05)	ns	ns	34		

1. Incremental cost:benefit ratio

Effect of seed rate. Shelling percentage and seed oil content were not influenced by seed rate. Oil yield increased with an increase in seed rate (because pod yields were higher at high seed rates), but the increase between seed rates of 125 and 150 kg ha^{-1} was not significant. Net realization and net incremental cost benefit ratio (1:2.38) were highest at the seed rate of 125 kg ha^{-1}.

Conclusions. The data thus indicate that for bunch groundnut GG 2 grown in the northern Gujarat agroclimatic zone, yield, quality, and profits can be maximized by scheduling irrigation at an IW/CPE ratio of 1.0 with 50 mm depth of water, and by using an interrow spacing of 22.5 cm and a seed rate of 125 kg ha^{-1}. Crop management did not affect the percentage oil content in seeds. Total oil production was directly proportional to seed yield.

Effect of 'Green Gold Plus' Application on Groundnut Yield

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Plant growth regulators are known to influence physiological processes in crop plants, and their positive impact has been reported in chickpea, soybean, sorghum, wheat, and many other field crops. This study was conducted during the 1992/93 postrainy season at ICRISAT Asia Center to determine the effect of 'Green Gold Plus' (GGP), an amino acid-based plant growth regulator, on growth and yield of groundnut. The composition of GGP (g L^{-1}) is as follows: free amino acid (total) 119, natural amino acid (total) 153, organic matter 189, total nitrogen 27, copper 2.5, manganese 10.0, magnesium 5.0, iron 2.6, zinc 28.0, boron 0.25.

The experiment was laid out in a randomized block design with three replications. Plot size was 3 × 1.5 m,

Table 1. Effect of Green Gold Plus, an amino acid based plant growth regulator, on groundnut yield in Alfisols, ICRISAT Asia Center, 1992/93 postrainy season.

Treatment	Yield (t ha^{-1})		
	Pod	Haulm	Seed
Green Gold Plus	3.06	3.83	1.91
Control	2.43	3.10	1.47
CV (%)	3.7	4.7	6.0
SE	±0.059	±0.095	±0.006
Increase over control (%)	26	24	35

sown on a 1.5 m wide broadbed-and-furrow (BBF) system. Each BBF contained four rows; rows were spaced at 30 cm and plants within a row at 10 cm. Foliar sprays of GGP were applied twice during the season, at 60 days and 75 days after crop emergence (DAE), using the recommended dose of 2.5 mL GGP L^{-1} water. In control plots, only water was sprayed up to drenching point. Standard agronomic practices were followed to raise a healthy crop.

The application of GGP contributed to an increase in the chlorophyll content of leaves; GGP-treated plants looked healthy and lush green one week after spraying, and growth was more uniform than in control plots. Differences in haulm, pod, and seed yields were quite distinct and consistent over replications (Table 1). Pod yield was 3.06 t ha^{-1} in sprayed plots and 2.43 t ha^{-1} in control treatments, reflecting a 26% increase as a result of two applications of GGP.

The manufacturer claims that GGP is non-toxic and safe for the operator. It is compatible with insecticides and fungicides recommended for the control of groundnut pests. Small samples for field research can be obtained from Khatau Junker Ltd, Bombay.

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Effects of Crop Residue Burning and Calcium Supply on the Growth of Groundnut Cultivars in a Sandy Clay Soil in Congo

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Groundnut production in the Congo is based on 'Swidden cultivation' (Atal 1974), which involves the burning of all crop residues. This experiment was conducted at the Institut de développement rural in Kombé-Brazzaville (4°20′S, 15°20′E, altitude 295 m). The objectives were to investigate the effects of burning and calcium supply on growth, nodulation, and yield of three groundnut cultivars in symbiosis with native cowpea *Bradyrhizobia.*

The experiment was conducted on a ferralitic sandy-clay soil containing 64% sand and 26% clay, in a field that had received no fertilizer for 2 years. The upper soil layer was deficient in organic matter (1.4% w/w) and acidic (pH 4.7). Rainfall during the 12-week growing period was 404 mm. Three groundnut cultivars—Talon-Dame (TD, a spanish variety), 73-30 (spanish), and Mixed Red of Loudima (MRL, valencia) were tested. Seed was obtained from Dr Mavoungou Nzaou's collection of the Centre de recherches agronomiques de Loudima in southern Congo.

A split-plot design with four replications was used. There were four treatments—burned and non-burned, calcium-treated and no calcium—of which the non-burned, no-calcium treatment was used as a control. Each plot was 6.4 m^2 in size. On burned plots, all crop residues were burned as outlined by El Moursi (1987) and NeSmith et al. (1987). In the calcium treatments, the recommended level (2 t ha^{-1}) of agricultural limestone containing 52.6% CaO was added to the top 15 cm soil layer before sowing. It was expected that this addition would increase soil pH from 4.7 to 5.6. Seeds were sown manually, 3–5 cm deep, on 19 Oct 1986. Spacing was 30 × 20 cm, equivalent to 160 000 plants ha^{-1}.

Five plants from each replicated treatment were randomly selected at full bloom, placed in plastic bags, taken to the laboratory, and separated into tops, roots, and nodules. Nodule number and mass per plant, biomass of plant top per plant, and percentage nitrogen content in nodules and plant tops were measured. For plant tops and nodules, biomass was determined by the method outlined by Faizah Abdul (1980) and van Beusichem (1981), while nitrogen content was determined by the Kjeldahl method.